

REMARKS

As a preliminary matter, Applicant appreciates the Examiner's acknowledgment of allowable subject matter.

As requested by the Examiner, Applicant has amended the claims to replace "whereby" with "wherein".

Claims 1, 3-5, 12-16, 18-20, 26-29 and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Burr et al. (U.S. 5,635,964). Applicant respectfully traverses the rejection because Burr fails to disclose or suggest a heater made of a thermistor material as recited in the claims.

Applicant respectfully notes that independent claims 1, 16 and 29 all recite a heater made of thermistor material.

In contrast, Burr discloses using thermistors 138a and 138b as a temperature sensing device. See, col. 6, lines 40-41. Burr's use of thermistors in a temperature sensing capacity fails to disclose or suggest the recited heater made of a thermistor material. Burr discloses a heater 120 (FIG. 4, col. 4, lines 25-33) which is distinct from the thermistors 138a and 138b.

For at least this reason, Applicant respectfully requests that the rejection of Claims 1, 16, and 19, and dependent claims 3-5, 12-15, 18, 20, 26-29 and 31 be reconsidered and withdrawn.

Still further, Applicant traverses the rejection of claims 1, 3-5, and 12-15 because the Examiner has failed to establish a *prima facie* case of obviousness.

As acknowledged by the Examiner, Burr fails to disclose or suggest a plurality of ink channels disposed in a common plane, each having at least one orifice for projecting ink towards a substrate, one of the features of the claimed invention. Applicant respectfully requests that the

Examiner cite a reference which discloses the recited feature and suggests the modification of Burr to include such feature.

Applicant further traverses the rejection of claims 29 and 31 because Burr fails to disclose or suggest, *inter alia*, first and second electrodes on one side of a planar member made of thermistor material, a feature of the claimed invention.

A noted above, the claimed invention includes an ink heater made of a thermistor material. The heater recited in claims 29 and 31 includes two electrodes on one side of a planar member made of thermistor material.

In contrast, Burr uses the thermistors 138a and 138b as a temperature sensing device. This application does not indicate the use of electrodes. Moreover, a person having ordinary skill in the art at the time of the invention would not have been motivated to modify Burr to include electrodes mounted on thermistors 138a and 138b, because this would render such device inoperable. Accordingly, Burr fails to disclose or suggest the recited structure.

Additionally, Applicant traverses the rejection of claim 31 because Burr fails to disclose or suggest means for thermally tuning the thermistor to the heat dissipation of the ink channels in the ink jet print head, a feature of the claimed invention. In fact, the Office Action fails to address this feature of the invention, and a close reading of Burr fails to support such rejection.

For all these additional reasons, Applicant respectfully requests that the rejection of claims 29 and 31.

Claims 2 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Burr et al. (U.S. 5,635,964) in view of Hiroaki (JP 3272854). Applicant respectfully traverses the rejection because the cited combination fails to disclose or suggest an ink heater made of a thermistor material having a positive temperature coefficient, a feature of the rejected claims.

Applicants respectfully repeat herein the reasons provided above in traversing Burr.

The Examiner's assertions with respect to Hiroaki are misplaced. Hiroaki discloses that the thermistor is used as a temperature sensitive voltage control device, not a heater. Specifically, Hiroaki discloses that the "resistance elements 14-1 through 14-n are [sic] resistances for correcting a temperature characteristic and are set properly to obtain a desired combined resistance." The resistance of resistance elements 14-1 through 14-n is temperature dependent. For this reason, Hiroaki terms elements 14-1 through 14-n as "thermal resistance elements". However, such terminology does not imply that Hiraokai discloses or suggests the recited ink heater made of a thermistor material. Hiroaki uses the positive coefficient thermistor in generally the same application as Burr, i.e., as a control circuit and *not* as an ink heater.

For at least these reasons, Applicant respectfully requests that the rejection of claims 2 and 17 be reconsidered and withdrawn.

Applicant has added new claims 32-37 which recite many of the features already recited in the pending claims, and are thus patentable over the prior art of record for at least the -reasons provided in traversing the rejection of claims 1, 3-5, 12-16, 18-20, 26-29 and 31.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. The Examiner should contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

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Appendix A
(Marked-Up copy of Amended Claims including newly added claims)

4. (Amended) The print head of claim 2, wherein the thermistor material includes a first side and a second side, and the ink heater includes a first electrode and a second electrode located on the first side of the thermistor material, [whereby] wherein heat is generated on the first side of the thermistor material between the first and second electrodes.

6. (Amended) The print head of claim 4, wherein the ink heater include a first edge and a second edge, the first edge is located opposite from the second edge, the first and second edge extend in a direction which is substantially perpendicular to the plurality of ink channels, the first electrode extends along the first edge and the second electrode extends along the second edge, [whereby] wherein the first and second electrodes are opposite from one another and substantially parallel.

7. (Amended) The print head of claim 6, wherein the first electrode extends near a center portion of the thermistor material, and the second electrode extends near the center portion of the thermistor material, [whereby] wherein the first and second electrodes are in close proximity to one another so as to minimize the time the ink heater reaches equilibrium.

9. (Amended) The print head of claim 8, wherein the plurality of ink channels include outside channels and inside channels, and the first and second electrodes include a first end and a second end and a mid-portion, wherein the first and second ends are wider than the mid-portion, [whereby] wherein greater heat is generated adjacent the outside channels than adjacent the inside channels.

10. (Amended) The print head of claim 8, wherein the plurality of ink channels include outside channels and inside channels, the first and second electrodes include a first end and a second end and a mid-portion, wherein the first and second ends are narrower than the mid-portion, [whereby] wherein greater heat is generated adjacent the inside channels than adjacent the outside channels.

19. (Amended) The print head of claim 17, wherein the thermistor material includes a first side and a second side, and the ink heater includes a first electrode and a second electrode located on the first side of the thermistor material, [whereby] wherein heat is generated on the first side of the thermistor material between the first and second electrodes.

22. (Amended) The print head of claim 19, wherein the ink heater include a first edge and a second edge, the first edge is located opposite from the second edge, the first and second edge extend in a direction which is substantially perpendicular to the plurality of ink channels, the first electrode extends along the first edge and the second electrode extends along the second edge, [whereby] wherein the first and second electrodes are opposite from one another and substantially parallel.

23. (Amended) The print head of claim 21, wherein the plurality of ink channels include outside channels and inside channels, and the first and second electrodes include a first end and a second end and a mid-portion, wherein the first and second ends are wider than the mid-portion,

[whereby] wherein greater heat is generated adjacent the outside channels than adjacent the inside channels.

24. (Amended) The print head of claim 21, wherein the plurality of ink channels include outside channels and inside channels, the first and second electrodes include a first end and a second end and a mid-portion, wherein the first and second ends are narrower than the mid-portion, [whereby] wherein greater heat is generated adjacent the inside channels than adjacent the outside channels.

30. (Amended) The thermistor of claim 29, further comprising a first edge and a second edge, the first edge is located opposite from the second edge, the first electrode extends along the first edge and the second electrode extends along the second edge, [whereby] wherein the first and second electrodes are opposite from one another substantially parallel.

32. (New) The thermistor of claim 29, wherein the first and second electrodes are formed in a pattern so as to thermally tune the thermistor.

33. (New) A method of thermally tuning an ink heater for an ink jet print head comprising the steps of:

forming the ink heater using a thermistor material; and
attaching a plurality of electrodes to the ink heater.

34. (New) The method of claim 33, wherein the plurality of electrodes are attached to the ink heater in a pattern based on the heat dissipation of the ink jet print head.

35. (New) The method of claim 33, wherein the thermistor material has a positive temperature coefficient.

36. (New) A method of maintaining the ink in an ink jet print head at a uniform temperature comprising the step of using an ink heater made of a thermistor material.

37. (New) The method of claim 36 wherein the thermistor material has a positive temperature coefficient.